Master's Thesis Defense Announcement

Mechanical and Aerospace Engineering Department

University of Texas at Arlington

DETERMINATION OF LANDING ZONES OF QUADROTORS EXPERIENCING IN-FLIGHT FAILURES

By

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Microsoft Teams Link

Abstract

In recent years, unmanned aerial vehicles (UAVs), commonly known as drones, have attained considerable prominence in a wide range of areas ranging from military operations, including surveillance, intelligence, and reconnaissance, to nonmilitary sectors such as delivery, entertainment, and agriculture. The low cost, small size, and ease of use of quadrotors provide significant advantages for such missions. At the same time however, the occurrence of physical failures in such vehicles, particularly if these failures occur while flying over highly populated areas, can pose considerable risk to people and premises on the ground. This thesis investigates scenarios of power loss due to one or more rotor failures of a quadrotor and performs an analysis of the ensuing crash radius of the vehicle, occurring because of this power loss. The baseline controller of the vehicle is assumed to be a nonlinear controller designed using a dynamic inversion method. Four different failure scenarios are simulated, and a comparison of the crash radius obtained from simulation results and an analytical formulation is performed.